MS. TITILAYO OLUFUNKE OSHODI (Orcid ID : 0000-0002-7959-0247)

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The nursing work environment and quality of care: A cross-sectional study using the Essentials of Magnetism II Scale in England.

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Titilayo Olufunke Oshodi*, BSc (Hons), PhD student, University of Greenwich, Faculty of Education and Health, Southwood Site, Room B206 Bronte Building, Avery Hill Road, London SE9 2UG;
E-mail: t.oshodi@greenwich.ac.uk
Tel: +44(0)7968081734

Senior Lecturer, Anglia Ruskin University, Faculty of Health, Social Care and Education, Chelmsford Campus, William Harvey Building, Bishop Hall Lane, Chelmsford, Essex, CM1 1SQ.
E-mail: Titilayo.Oshodi@anglia.ac.uk
Tel: +44(0)7968081734;
+44(0)1245 684775

*Corresponding author: t.oshodi@greenwich.ac.uk ; Titilayo.Oshodi@anglia.ac.uk

Dr. Rachel Crockett, PhD, Division of Psychology, Faculty of Natural Sciences, University of Stirling, Stirling, Scotland, FK9 4LA
E-mail: Rachel.crockett@stir.ac.uk

Dr Benjamin Bruneau, PhD, Senior Lecturer and Programme Leader, University of Greenwich, Faculty of Education and Health, Southwood Site, 2nd Floor Seacole Building, Avery Hill Road, London SE9 2UG
E-mail: B.S.Bruneau@greenwich.ac.uk
Tel: 02083318064

Professor Elizabeth West, PhD, Professor in Applied Social Science, University of Greenwich, Faculty of Education and Health, Southwood Site, 2nd Floor Bronte Building, Avery Hill Road, London SE9 2UG
E-mail: E.West@greenwich.ac.uk
Tel: 02083318850

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Disclosure

The authors have confirmed that all authors meet the ICMJE criteria of authorship credit (www.icmje.org/ethical_1author.html), as follows: (1) substantial contributions to conception and design of, or acquisition of data or analysis and interpretation of data; (2) drafting the article or revising it critically for important intellectual content, and (3) final approval of the version to be published.

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Conflict of interest

The authors declare that they have no conflict of interests

Abstract

Aims and objectives. To explore the structure of the Essentials of Magnetism II (EOMII) scale using data from nurses working in England; and to describe the impact of different aspects of the nursing work environment on nurse assessed care quality (NACQ).

Background. The EOMII Scale was developed in the United States to measure nursing work environments. It has been widely used in the United States and in a number of other countries, but has not yet been used in the United Kingdom.

Design. Cross-sectional study.

Methods. Registered nurses (n=247) providing direct patient care in two National Health Service hospitals in England completed the EOMII scale and a single-item measuring NACQ. Principal Components Analysis was used to assess the structure of the scale. Correlation and regression analyses were used to describe the relationships between factors and NACQ.

Results. A solution with explanatory variance of 45.25% was identified. Forty items loaded on five factors, with satisfactory consistency: i*) ward manager support*; ii) *working as a team*; iii) *concern for patients*; iv) *organisational autonomy*; and v) *constraints on nursing practice*. While in univariate analyses each of the factors was significantly associated with NACQ, in multivariate analyses, the relationship between *organisational autonomy* and NACQ no longer reached significance. However, a multiple mediation model indicated that the effect of *organisational*

autonomy on NACQ was mediated by *nurse manager support*, *working as a team*, and *concern for patients* but not *constraints on nursing practice.*

Conclusions. Subscales of the EOMII identified in an English sample of nurses measured important aspects of the nursing work environment, each of which is related to NACQ.

Relevance to clinical practice. The EOMII could be a very useful tool for measuring aspects of the nursing work environment in the English Trusts particularly in relation to the quality of care.

Key words: Autonomy, Essentials of Magnetism II scale, nursing care quality, nursing work environment.

What does this paper contribute to the wider global clinical community?

- As nurses' work is increasing in an internationalised world with movement between different cultures, this research makes evident the need to understand how nursing practice and particularly conceptions of autonomous nursing practice may vary culturally.
- In this study, the relationship of *organisational autonomy* to nurse-assessed care quality is mediated by *ward manager support, concern for patients* and *working as a team* indicating that these three constructs act as facilitators of *organisational autonomy.*
- There is only a weak relationship between *organisational autonomy* and *constraints on nursing practice* implying that these two factors are largely independent of each other. This suggests that improving the nursing work environment and consequent patient outcomes requires that factors that both support as well as hinder nursing practice are addressed by policy makers and nurse managers.

INTRODUCTION

Nurses are the largest group of healthcare professionals in the UK and thus understanding their impact on effective healthcare delivery is a pressing concern. There is a long tradition of research on how adequate numbers of nurses affects the quality and safety of healthcare. However, research has also shown that there are organisational factors above and beyond the number of nurses that also affect patient outcomes. These factors are often summarised in the concept of the "nursing work environment". Different researchers use varying terms and definitions to conceptualise the organisational features that have an impact on nursing practice. A recent definition of the nursing work environment specifies both the key elements of a positive nursing work environment and the impact of these elements on nursing practice:

> *"…a system that supports and promotes effective communication, control over the contextual system in which nursing is practiced, delivery of nursing care, collaborative relationships with physician, and increased opportunities for autonomous decision making".*
>
> Kramer *et al.* (2013, p.350)

The importance of the nursing work environment was recognised nationally in England during the inquiry into failures of care at Mid-Staffordshire NHS Trust. The Francis report (2013) linked poor clinical outcomes and experiences in the hospital to low staffing and poor nursing work environments. The report states: *"The culture at the Trust was not conducive to providing good care for patients or providing a*

supportive working environment for staff; there was an atmosphere of adverse repercussions..." (Page 13, no 24) and further; *"As a result of poor leadership and staffing policies, a completely inadequate standard of nursing was offered on some wards in Stafford. The complaints…testified not only to inadequate staffing levels, but poor leadership, recruitment and training. This led in turn to a declining professionalism and a tolerance of poor standards"* (Page 45, 1.14). These recent, raw experiences in the NHS highlight the centrality of the nursing work environment to the provision of safe, effective and compassionate care.

Improvements in healthcare delivery require that national and local policies support the development of healthy and productive nursing work environments. The design and evaluation of any interventions to improve the nursing work environment depends on the use of a sound measurement instrument. The Essentials of Magnetism II (EOMII) scale (Schmalenberg & Kramer 2008) which was developed to assess the characteristics of Magnet hospitals in the US is one potential candidate for this role.

BACKGROUND

What are Magnet hospitals?

In the early 1980s, the United States was struggling with a serious nursing shortage, and yet this shortage of nursing staff did not affect certain hospitals. The nursing shortage prompted a formal investigation by a task force of researchers from the American Academy of Nursing in 1982 – 1983 (McClure *et al.* 2002). The task force was charged with examining hospital nursing practice, and it was discovered that nurses were attracted and retained in hospitals settings for reasons that had never

been fully explored or understood (McClure *et al.* 2002). This study by the task force was designed to collect data from a sample of the hospitals that had a successful track records in attracting and retaining professional nurses. The purpose was to investigate the key factors responsible for their success, and to explain such factors in such a way that those hospitals might be emulated (McClure *et al.* 2002). Forty-one hospitals which had demonstrated high rates of nurse satisfaction, and low employee turnover rates were selected as sample (McClure *et al.* 2002). These hospitals were identified as "Magnet hospitals" on account of having features that attracted and retained highly skilled professional nurses (Kramer & Schmalenberg, 2002: 25). It was found that the professional practice environment and quality nursing care were important contributing variables to the hospitals' "magnetism" i.e. a hospital's ability to attract and retain nursing staff (Sovie, 1984).

The commitment to quality patient care and excellence in nursing was a shared value throughout nursing organisations that had this quality (Sovie, 1984; McClure et al, 2002). Features they appeared to have in common included the fact that they sought and valued staff opinions, were decentralised and had a participatory management structure and style that assured staff involvement in decision making (Sovie, 1984; McClure et al, 2002). Head nurses were recognised as key managers in the hospital, and they shared with the clinical directors and the directors of nursing the responsibility for assuring that the required complement of well qualified, clinically competent nurses were available to give care to patients (Sovie, 1984; McClure et al, 2002). Salaries were competitive and differentials were paid for education, experience, and clinical advancement (Sovie, 1984). Good nurse-

physician relationships were based on mutual respect for each discipline's knowledge and competence, and on mutual concern for quality patient care.

Based on the above research, 14 distinguishing features that were peculiar to "Magnet" hospitals were identified, and remain known as the American Nurses Credentialing Centre (ANCC) Forces of Magnetism that provide the conceptual framework for the Magnet appraisal process (American Nurses Credentialing Centre, 2016a). The presence of these features in a hospital is required to achieve Magnet designation (ANCC 2016a).

However, a recent systematic review conducted by Odessa & Regnaux (2015) provided equivocal evidence as to the beneficial effects of Magnet accreditation on objective nurse and patient outcomes. Of the of the seven studies examining patient outcomes, only three found statistically significant improvements related to lower pressure ulcers, patient falls, failure to rescue and 30-day inpatient mortality in Magnet hospitals compared with non-Magnet hospitals. In the four studies examining nurse outcomes, three found statistically significant improvements related to higher job satisfaction and lower intent to leave and turnover rates in Magnet compared to non-Magnet hospitals. Odessa & Regnaux (2015) concluded that while accreditation continues to be generally accepted as an important driver to improve quality and safety in healthcare organisations, there is still limited evidence to indicate that the pursuit of Magnet accreditation is the best use of resources. The limitations in the current evidence base suggest that further research is required not just to understand whether or not Magnet accreditation improves outcomes for patients and staff, but the conditions under which it is most likely to be effective.

The United Kingdom experience and the Magnet connection

There are currently 448 accredited Magnet hospitals in the world: three in Australia, one in Canada, one in Lebanon, two in Saudi Arabia, and the remainder are in the United States (ANCC, 2016b). Currently, in China, some hospitals have begun constructing a Magnet nursing work environment by introducing Magnet evaluation standards, and using them to evaluate the effectiveness of producing a productive nursing work environment (Gu & Zhang 2014). Although there are currently no Magnet Hospitals in the United Kingdom, there are plans for a Magnet type accreditation in England (Health Education England 2016a). Health Education England's (HEE) has made excellence in nursing practice one of its priority areas in order to ensure that the education and training of registered nurses and care assistants is suitable to support them in delivering high-quality care over the next 10-15 years (Health Education England 2015, Health Education England 2016a). In order to promote learning and excellence in health and care practice, HEE is currently working with the Florence Nightingale Foundation to explore how the nursing excellence standards developed by the American Nurses Credentialing Centre can be applied in England (Health Education England 2016a).

The Oxford University Hospital Trust in England has been working towards its application for a Magnet status (Merrifield 2016). Oxford University Hospital has been making improvements in the areas of nurse education and training as part of its application, which may take up to five years to complete. These improvements have attracted interest from some other UK organisations, including Heart of England NHS Foundation Trust and Nottingham University Hospitals NHS Trust (Merrifield 2016), leading to the creation of the UK Magnet Alliance in 2016, a group to support others

considering Magnet accreditation (Merrifield, 2016, Weir-Hughes & Jackson, 2016). Rochdale Infirmary in Lancashire was the only UK hospital to have previously been accredited Magnet status (Aiken *et al.* 2008, Lomas 2010, Merrifield 2016), and it was recognised as the first Magnet hospital outside the USA (Aiken *et al*. 2008). In order to examine the impact of Magnet status on the Rochdale Infirmary, Aiken *et al.* (2008) drew primarily from the findings of two surveys of nurses working at Rochdale in 2000 and 2002 as well as comparisons with nurses employed in a national sample of NHS acute trusts. This study aimed to assess changes in the nurse work environment during the period that Rochdale was preparing for, and the period the Magnet designation was achieved (2000 – 2002). It was found that the implementation of the Magnet hospital intervention was associated with a significantly improved nursing work environment as well as improved job-related outcomes for nurses and markers for quality of patient care (*Aiken et al.* 2008). However, Rochdale Infirmary, Lancashire failed to renew its Magnet Status when the trust became part of Pennine Acute Hospitals Trust (Lomas 2010, Merrifield 2016).

To achieve accreditation, an organisation has to demonstrate it is meeting a series of Magnet standards which include those of national safe staffing policies, minimum training levels and around nurse-sensitive clinical indicators (Merrifield 2016). Magnet standards are consistent with Care Quality Commission standards, the World Health Organisation safety priorities and the Nursing & Midwifery Council Code of Conduct (Weir-Hughes & Jackson 2016).

The Magnet hospitals and the EOMII

The first attempt to measure the nursing work environment based on the characteristics of Magnet hospitals was made by Kramer & Hafner (1989). Their 65 item scale, called the Nursing Work Index (NWI), was developed to measure nurse job satisfaction and productivity of quality patient care. In completing the NWI, the respondent makes three judgments for each of the items: (1) how important the factor is for job satisfaction; (2) how important the factor is for producing quality nursing care; and (3) the extent to which the factor is present in their current job (Kramer & Hafner 1989). Four additional scales have been derived from the NWI. Aiken & Patrician (2000) constructed the 57-item four subscale Revised Nursing Work Index (NWI-R) from the original NWI by analysing the data at unit or hospital level rather than at nurse level; Lake (2002) constructed the 31-item five subscale Practice Environment Scale of the Nursing Work Index (PES-NWI); Estabrooks *et al*. (2002) constructed the Practice Environment Index (PEI), using 49 items from Aiken & Patrician's (2000) NWI-R scale, and adding two items to reflect the Canadian context; and Choi *et al.* (2004) constructed the Perceived Nursing Work Environment Scale (PNWE) also from the NWI-R.

However, Kramer & Schmalenberg (2005a) cautioned that the NWI only measures the structural characteristics of hospital units, and not nursing work processes. In addition, Kramer & Schmalenberg (2004) suggest that the NWI is now outdated, and many of its items lack a commonly shared and understood definition. They also maintained that the revisions made in the NWI by Aiken and Patrician do not solve the NWI's problems of out-datedness, and that the revised NWI no longer measures job satisfaction or productivity of quality care. The Essentials of Magnetism (EOM)

tool was developed by Kramer & Schmalenberg (2004) partly to address these concerns. The scale was found to have eight subscales which are*: i) building and maintaining good nurse-physician relationships; ii) clinical autonomy; iii) a culture in which concern for the patient is paramount; iv) working with clinically competent co-workers; v) control of nursing practice; vi) perceived adequacy of staffing; vii) support for education, and viii) nurse manager support.* Substantive changes were made to the *"Perceived adequacy of staffing"* (Kramer & Schmalenberg, 2005b) and *"Nurse Manager Support"* (Kramer et al 2007) subscales of the EOM, and the tool was re-named the Essentials of Magnetism II scale (Schmalenberg & Kramer 2008). The EOMII is a 58-item four-point, Likert-type tool designed to measure healthy, magnetic, and productive clinical work environments and can facilitate investigation of the extent to which the work environment supports or hinders nurses in providing high quality patient care.

Although there is interest in the UK in the concept of Magnet hospitals and plans to make Magnet characteristics more common in English Trusts, the English nursing work environment has not, as yet, been assessed using the EOMII.

International studies using the EOMII

The EOMII has been widely used in studies in the US (e.g. Weatherford 2011; Kramer *et al.* 2011, Kramer *et al.* 2013). Over the last few years there has been increasing international interest in measuring and assessing the nursing work environment and several studies have used the EOMII in very different health care settings. A systematic search of electronic databases identified three studies which explored the psychometric proprieties of the EOMII scale in countries outside the

US. The first was conducted in Turkey (Yildirim *et al*. 2012). A seven factor solution was identified largely reflecting the original eight factor solution described by Schmalenberg & Kramer (2008), although three items were excluded and a number of included items loaded on different factors in this sample. Of note were three items that moved between the *clinical autonomy* and *control over nursing practice* factors. Similarly, a Chinese study found that seven items moved between the *clinical autonomy* and *control over nursing practice* factors and their solution differed from the original scale with nine factors identified (Bai *et al.* 2013). Finally, a study of Dutch nurses identified five factors that replicated factors in the original solution. However, the remaining items from the factors *clinical autonomy, clinically competent peers* and *patient-centred culture* loaded onto two novel factors (de Brouwer *et al.* 2013). Overall, this evidence suggests that while the scale is very useful in different settings, the structure of the scale may differ in significant ways across different healthcare systems. In particular the results suggest that nurses' experience and/or conceptualisation of nursing autonomy and control over practice may vary depending on the organisation and management of nursing work which may vary from country to country.

THE STUDY

Aims and research questions

The main aim of this study is to investigate whether the EOMII is a useful way of measuring the nursing work environment in England. The research questions are:

1. What is the factor structure of the Essentials of Magnetism II Scale in data gathered from a sample of hospital nurses in England?

2. What are the associations, if any, between the factors measuring the nursing work environment and nurse-assessed care quality in England?

Method

Study design

A cross-sectional survey study.

Setting

The study was conducted in two local district general hospitals in the South East of England. All the general medical and surgical wards in the two hospitals were included in the study.

Participants

Registered nurses providing direct adult patient care on 29 wards across the two hospitals were recruited. Nurses eligible to participate were those who had worked on their present ward for a minimum of one month.

Procedure

Initial contacts were made with the ward manager of each target ward in order to discuss the aims and the purpose of the research. With their agreement, nurses on the ward were made aware of the study at ward meetings and a large poster about the study was displayed on the notice board. Survey packs containing a cover letter, the survey questionnaire and consent forms were distributed to the registered nurses. As some of the questions were potentially sensitive, particularly those concerning relationships with the ward manager, we were concerned to protect the

anonymity of participants and the confidentiality of the data. Questionnaires were returned anonymously via a secure box on each ward. By ensuring anonymity and confidentiality, we were seeking to protect participants and to decrease the pressures to give socially desirable responses. The researcher visited each ward twice a week over the course of the study, to answer any questions about the study and collect completed questionnaires. The survey was conducted in the period 2nd May to 31st October 2012.

Ethics approval

The study received ethics approval from London-Surrey Borders NHS Research Ethics Committee, study reference number: 11/LO/1329.

Measures

The Essentials of Magnetism Scale II (EOMII): Responses to each of the 58 items are assessed on four-point rating scales. Six of the items assessing the relationships between nurses and medical staff are rated on scales anchored at 1 (not true for any doctors) and 4 (true for most doctors most of the time). The remaining items are rated on scales anchored at 1 (strongly disagree) and 4 (strongly agree). Negative items are reverse scored. Following discussion with the scale authors and the Ethics Committee, minor changes were made to the wording of some items to adapt them to use in a UK sample. For example, “Techs” (an abbreviation) was changed to technicians; “unit” was changed to ward; and “Physician” was changed to Doctor (further information available from the authors).

Nurse-assessed quality of care: One item asking participants to rate the quality of care on their ward on an 11-point scale anchored at 0 (dangerously low quality) and 10 (very high quality).

Demographic and occupational characteristics of individual nurses:

1. Gender: male or female
2. Age: Participants were asked to indicate their age within one of nine categories, specifically i) 21-24, ii) 25-29, iii) 30-34, iv) 35-39, v) 40-44, vi) 45-49, vii) 50-54, viii) 55-59 and ix) 60 or over.
3. Education: Less than degree level (diploma) or a bachelor's degree or higher.
4. Years of nursing work experience.
5. Length of time working on current ward.
6. Job role: Staff nurse or Sister/ Charge Nurse

Data Analysis

Analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 20.0 (International Business Machines Corporation 2011). Descriptive statistics were used to describe the characteristics of the sample. Principal Components Analysis (PCA) with varimax rotation was used to assess the factor structure of the EOMII in the UK sample. Associations between the extracted factors and nurse-assessed quality of care were assessed using Pearson's correlation. To explore further the relationships between the extracted factors and nurse-assessed care quality a hierarchical multiple regression was conducted with nurse-assessed care quality as the dependent variable, with the predictor variables being added in four steps. In the first step the demographic variables, age, gender,

and education were entered as *control* variables; in the second step, job role was entered, followed by a dummy variable identifying the hospital and in the final step, the extracted factors of the EOMII were entered. To best understand the results of the multiple regression, a multiple mediation model was tested using the SPSS add-on "Process" (Hayes 2014), which allows a bootstrapped estimate of indirect effects to be calculated, providing a robust assessment of the size of these effects.

Results

Overview of the sample

Four hundred and thirty-eight registered nurses were sent questionnaires and 247 returned a completed questionnaire, giving an overall response rate of 56.39%. The demographic characteristics of the sample are shown in Table 1. Most of the respondents were female, around a quarter were aged between 35 and 39 years old and around a third of the sample was educated to degree level. This is a much smaller proportion than appears in most studies conducted in the US where around 50% will have an undergraduate degree and a small percentage will have a Master's degree or a PhD. It is notable that the sample had relatively high levels of nursing experience (mean = 11.11 years; SD = 9.52 years) and length of service on their current ward (mean = 4.72 years; SD = 5.14 years).

Research Question 1: What is the factor structure of the Essentials of Magnetism II Scale in a UK sample of hospital nurses?

The data were assessed to evaluate whether PCA was an appropriate procedure to use to explore the structure of the EOMII. The Kaiser-Meyer-Olkin test result was .92, indicating a sufficiently large sample and Bartlett's test of sphericity was

significant, indicating that there were sufficient correlations between variables to make it appropriate to conduct PCA. An initial solution of five components with eigenvalues greater than one and explaining 45.25% of the variance was found. The solution was rotated using .03 as the cut-off for the inclusion of items on a factor. This resulted in a solution comprising 40 items loading on to one of the final five components or factors, with their Cronbach's alpha coefficients ranging between .76 and .94, indicating good reliability.

Ward manager support: thirteen items comprised this factor, with loadings between .39 and .84 which, taken together, explained 16.82% of the variance. Although there are some differences, this is essentially the same as the *"Nurse Manager Support"* factor in the EOMII eight factor solution which we have renamed to reflect the terminology used in the UK. The items reflect the role of the ward manager in supporting the work of individual nurses, for example by building team cohesion and facilitating effective management by being seen as diplomatic, fair and honest.

Working as a Team: eight items with loadings between .40 and .72 comprised the second subscale, with an explanatory variance of 8.88%. This factor has items from three different EOMII subscales, which are *"perceived adequacy of staffing", "working with clinically competent peers"*, and *"a culture in which concern for the patient is paramount".* The items are indicative of team working both within nursing and with other disciplines present on the ward. Items also indicate expectations of high performance and productivity from everyone.

Concern for patients: seven items comprised the third factor, with loadings between .39 and .76, explaining 7.91% of the variance. This component included items that represent the core beliefs, shared feelings and ethos of the organisation. It also includes items that are indicative of quality patient care being the priority in the organisation. There is a strong similarity to the *"culture in which concern for the patient is paramount"* subscale of the US EOMII with 7 of the 11 items loading on this factor.

Organisational autonomy: Six items comprised the fourth factor, with loadings between .31 and .70 and explaining 5.99% of the variance. This has two items from the *"clinical autonomy"* and four items from the *"control over nursing practice"* subscales of the EOMII original eight factor solution. The items were concerned with the extent to which nurses perceived that they have *control* over their professional practice, make decisions relating to patient care and are recognised by other disciplines as being responsible for autonomous nursing practice. This factor explicitly focuses on nurses' autonomy at the level of the organisation and the extent to which they have control over nursing practice and policy, rather than clinical autonomy which would be demonstrated in their work with patients.

Constraints on nursing practice: the final factor comprised six items with loadings between .50 and .80, explaining 5.66% of the variance. This has four items from *"clinical autonomy"* and two from *"control over nursing practice"* in the original EOMII eight factor solution. Included items concerned the barriers that nurses encountered in their work hindering their professional practice and to the exercise of clinical autonomy in relationship with patients. For example, it included items indicating that

nurses have to do things that, in their professional judgment, may not be in the best interests of the patient, or that they are limited in their independent decision-making. Constraints on nursing practice seem to indicate restrictions on clinical autonomy.

Research Question 2: What are the associations between the factors measuring the UK nursing work environment and nurse-assessed care quality?

The five factors identified in the principal components analysis were used to explore the relationships between aspects of the nursing work environment and nurse-assessed quality of care. Correlations between the factors and nurse-assessed care quality are shown in Table 3. The correlations between *ward manager support*, *working as a team*, *concern for patients* and *organisational autonomy* are all positive, significant at the $p < .001$, and relatively large, varying between .50 and .69. In contrast associations between these factors and *constraints to practice* are negative and while still significant they are substantially smaller with the weakest association being between *organisational autonomy* and *constraints on nursing practice*. The correlations between nurse-assessed care quality and the three factors, *ward manager support*, *working as a team* and *concern for patients,* were all positive and substantial while the association between care quality and *organisational autonomy* was also positive but of a more moderate size while the correlation with *constraints to practice* was small and in a negative direction, as might be anticipated.

A hierarchical multiple regression model used to explore further the relationships between the factors assessing the nursing work environment and nurse assessed care quality revealed that each of the control variables (i.e. age, gender, and education) entered in the first step had very small, non-significant regression

coefficients (table 4). The R^2 of -.004 indicates that this model explains very little of the variance in nurse-assessed care quality. Job role and hospital which were then entered in the second and third steps respectively were also non-significant predictors accounting for very little additional variance. In the final step, the five factors extracted from the EOMII gave a significant model (adjusted R^2 = .38, F= 14.30, *p*< .001). *Ward manager support* (β = .22, t= 2.86, *p*<.01), *concern for patients* (β =.18, t= 2.16, *p*<.05) and *working as a team* (β = .27, t= 3.35, p< .01) were all significant predictors of nurse-assessed care quality. *Constraints on nursing practice* was also a significant, but negative, predictor of nurse assessed care quality (β =-.11, t= -2.00, *p*<.05). However, *organisational autonomy* was not a significant predictor in this multivariate analysis (β=.02, t = .24, *ns*).

Post hoc analysis

The planned analyses showed that although there was a significant association of *organisational autonomy* and nurse-assessed care quality, when the association of *organisational autonomy* with other aspects of the nursing work environment was controlled in the multiple regression analysis, the association was reduced to non-significance. This suggested that the effect of *organisational autonomy* on nurse-assessed care quality might be mediated by the other four dimensions of the nursing work environment. Mediation occurs when there is an indirect effect of an explanatory variable on an outcome variable through one or more mediator variables. To test this supposition a multiple mediation analysis was conducted using *organisational autonomy* as the independent variable, nurse-assessed care quality as the dependent variable and the other four factors as the mediating variables.

This analysis showed that the combined indirect effect of *organisational autonomy* on nurse-assessed care quality through the other four factors was significant with a bootstrapped estimate for the effect of 1.46 (95% CI 1.0750, 1.9051). *Ward manager support* (effect estimate =.37, 95% CI .07, .76), *working as a team* (effect estimate= .58, 95% CI .19, .95), and *concern for patients* (effect estimate = .46, 95% CI .11, .81,) were significant individual mediators of the effect of *nurse autonomy* on nurse-assessed care quality but *constraints on nursing practice* was not a significant mediator (figure 1).

DISCUSSION

Summary

This is the first research to our knowledge to explore the structure of the EOMII Scale using data gathered from nurses working in England. A five-factor, 40 item solution for the EOMII was found to best fit the English data. The five factors were significantly associated with one another and with *nurse-assessed care quality* in univariate analyses. In the multivariate model, while four of the five factors assessing the nurse working environment were significant predictors of *nurse-assessed quality of care*, *organisational autonomy* was not a significant predictor of *nurse-assessed quality of care*. A multiple mediation model indicates that organisational autonomy does not have a significant independent effect on *nurse-assessed quality of care* but is rather mediated by, or works through the other factors that are important in the nursing work environment. This indicates that these three factors act as facilitators of *organisational autonomy*.

The EOMII and the nursing work environment

The factor structure of the EOMII in the English sample was found to differ substantially from that found in the US. Principal Component Analysis extracted a 40-item five-factor solution, in contrast to the eight-factor solution in the US sample. None of the five factors wholly reflected the original solution, but two factors were substantially similar. The first of these was "ward manager support". This is not surprising since the pivotal role played by ward managers (in the UK) or nurse managers (in the US) has been recognised for decades. In the US, the role of the nurse manager has been the subject of much research (e.g. Kramer *et al.* 2007). In the UK the importance of the role has been recognised in reports on the organisation and management of acute health services since the Salmon report (1966), in research on ward sisters (Pembray 1980) and has again been highlighted in the Francis report (2013) on failures of care in Mid Staffordshire NHS Trust. A study of nurses in acute hospitals in London found that the quality of relationships between staff and the ward manager was key to their decision to stay in their jobs (Barron, West & Reeves 2007).

There was also a great deal of overlap between the *"concern for patients"* factor in England and the *"culture of concern for patients"* in the US. In both countries, nurses are profoundly affected by the values and ethos of the hospital in relation to patient-centred care. Eighteen items from the original EOMII were excluded from the English solution. All six items in the *nurse-doctor relationship* (items 1 – 6) in the original EOMII did not appear in the English solution. This may reflect differences in the organisation of medical work in the two countries. In the US, patients retain their own physician when they are admitted to hospitals whereas the ward medical team

takes over care in England. This might warrant further study in order to understand how the interactions of the two professional groups are shaped by the way that work is organised.

Several, but not all, items from the US factors *perceptions of adequacy of staffing, working with clinically competent peers* and *culture of concern for patients* loaded onto the "working as a team" factor in England. These differences may suggest either that the dimensions of the nursing work environment measured by some factors found within US populations may not be relevant to nurses in England or, alternatively, that these dimensions are important to nurses in England but the items do not capture their experiences. The differences in the structure of the scale in the two populations also raise the possibility that there may be dimensions of the US nursing work environment which are not apparent in a description of the English nursing work environment using the EOMII.

Items that load on two factors in the eight factor solution, *"clinical autonomy"* and *"control over nursing practice"* were distributed across two factors that we are calling *"organisational autonomy"* and *"constraints to nursing practice"*. We interpret the former as referring to the extent to which nurses' control nursing practice and policy at the organisational level and the latter as organisational barriers that make it difficult to exercise clinical autonomy in their relationships with patients. The boundaries that exist around nursing practice and the extent to which nurses' can exercise agency in the context of the hospital organisation are clearly relevant and important in both the US and England.

Clinical autonomy is recognised internationally as central to nursing practice and the delivery of high-quality patient care (Stewart *et al.* 2004, Skar 2009). It is therefore of particular interest that in this English sample *organisational autonomy* was not an independent predictor of *nurse assessed care quality* but was rather mediated by the *ward manager support, concern for patients*, and *working as a team*. This may indicate that in this sample *organisational autonomy* is not perceived as lying only with the individual, but is constructed as arising also from the more collective aspects of the ward and hospital organisation. Future research may seek to explore whether conceptualisations of organisational autonomy across different healthcare systems vary. In an increasingly globalized world, with a highly mobile workforce, a culturally shared understanding of autonomy will support high quality nurse education and practice internationally.

Exploration of recent changes in the NHS and nurse education

Since the data for this study were collected in 2012, there have been a number of changes in the NHS that may have an impact on the nursing work environment. Some of the most significant include the move to an all-graduate professional qualification, the introduction of the NMC Code, the implementation of NMC Revalidation, and the increasing pressure on Trusts, post-Francis (2013), to ensure safe staffing levels.

On the 12th of November 2009, the then Health Minister Ann Keen announced that the minimum level for pre-registration courses for nurses would be raised from diploma to degree level and that all courses should meet the new standards developed by the Nursing and the Midwifery Council (DoH, 2009). All new nurses

were educated to degree level from 2013, making them better equipped to improve the quality of patient care (DoH, 2009).

The minority of nurses who participated in this study were graduates, but over time, the population of registered nurses will gradually change so that eventually all will be educated to degree level. This could have a profound impact on nurses' perceptions of key concepts in this study, including, importantly, clinical and organisational autonomy.

In future, the role of the registered nurse is also likely to change as they assume responsibility for staff who have entered the profession as apprentices or associates. The apprenticeship route into nursing will enable students to train directly towards becoming a nurse (Department of Health 2014) and will provide an opportunity for talented care support workers to progress into nursing, giving them a route to advance their careers and a chance to use their vocational experience to enter the nursing profession (Department of Health 2014).

In 2015, the government announced a plan to create a new nursing support role, called nursing associates (HEE 2016b) who will work alongside care assistants and registered nurses to deliver hand-on care. This role, recommended by The Shape of Caring Review (HEE 2015) could also be a new route for those wishing to become a registered nurse. Again, on the 12th October 2016, the government announced that over 2,000 Nursing Associates will begin training before the end of 2016, and run over a two year period. Eleven sites have been chosen to deliver the first wave of training that will start in December 2016 (HEE 2016c). Taken together, these

changes in nursing education, including the move towards graduate preparation and the development of new roles are likely to have a profound impact on the nursing work environment and consequently the key concepts in this study, particularly team work and autonomy.

In the light of the recommendations in the Francis report, the new NMC Code was launched in January 2015 and came into force in April 2015 (NMC, 2013, 2015). The Code has a particular focus on issues relating to fundamental standards, to ensure that the needs of patients are always put first (NMC, 2013, 2015). A fundamental aspect of the Code is the requirement that nurses and midwives to be open and honest (NMC, 2015, 2016). They need to have the support of a working culture where they are able to learn from mistakes and feel comfortable reporting incidents that have led to harm (NMC, 2015, 2016). The NMC Joint Guidance with the General Medical Council on the professional "duty of candour" for doctors, nurses, and midwives was published in June 2015 and provides practical advice on the common duty to be transparent and truthful with patients (NMC, 2016).

Central to the new NMC Code is the NMC revalidation (NMC, 2013, 2016), which was part of the NMC's response to the Francis Report into the failings at Mid Staffordshire NHS Foundation Trust (Francis, 2013). The revalidation process was launched in April 2016, and is a new process that all nurses and midwives will need to go through in order to renew their registration with the NMC (NMC, 2016). It was introduced to raise awareness of the Code and professional standards expected of nurses and midwives. Revalidation requires that every nurse and midwife on the register demonstrate on a regular basis that they are able to deliver care in a safe,

effective and professional way. This puts public protection at the heart of the nursing and midwifery professions and supports nurses and midwives to continually develop and reflect on their practice throughout their careers (NMC, 2016). Future research on the nursing work environment will need to consider the statements in the code which set out what good nursing practice looks like.

Reports into the failings at Mid Staffordshire NHS Foundation Trust revealed that inadequate staffing levels were related in an important way to the poor quality of care (Francis 2013). Post-Francis, there has been a sharp increase in the demand for nursing staff. Trusts have spent more on staffing, including temporary and agency staff, in order to provide safe and compassionate care. However, levels of staffing remain one of the most critical issues that challenge the NHS.

Concerns about staffing led to the proposal in the Francis report that the National Institute for Health and Care Excellence (NICE) develop an evidence-based guideline for the NHS on staffing levels across a variety of settings in 2014 (NICE 2014, RCN 2016). In that year, the minimum staffing for adult nursing was published, and the report concluded that there was no single nurse-to-patient ratio that could be applied across all acute adult inpatient wards (NICE 2014). It noted, however, that there was evidence of increased risk of harm associated with a registered nurse caring for more than eight patients during daytime shifts (NICE 2014:22). This guideline is regularly cited as an underlying factor for the rise in agency bills and the shortage of nurses in England (RCN 2016).

In June 2015, NICE announced it was abandoning the safe staffing programme and did not publish the finished A & E guideline (RCN 2016). It has been claimed (RCN 2016) that the decision to decommission NICE was linked to concerns that the cost of implementing the guideline would be too great. The NHS Improvement has since taken over the safe staffing project (RCN 2016). A report published by the National Audit Office (2016) highlighted that all major clinical staff groups with data available had shortages in 2014, with particularly high levels for nurses, midwives and health visitors. There was a shortfall of 7.2% between the number of nursing, midwifery and health visiting staff that the staff providers said they needed and had budgeted for (386,200) and the number of staff in post (358,220).

In summary, there have been some very significant changes in the NHS since the data for this study were collected. The profession has been refocused on the provision of compassionate and safe care as stated in the NMC code, and nursing education has moved towards graduate level, supplemented by new routes into nursing, such as apprenticeships and new roles such as nursing associates. At the same time, the NHS is caught in an increasingly difficult dilemma which is that while compassionate and safe care demands high levels of nurse staffing, the financial situation and the availability of suitably trained staff makes it increasingly difficult to provide adequate numbers of nurses to meet the demands for care.

What nurse leaders should do to implement these findings in practice

Nurse leaders could use the five-factor EOMII scale identified in this study to give a baseline measurement of the nursing work environment in the clinical areas for which they are responsible. If interventions to improve the nursing work environment

could be devised and implemented, the EOMII could then be used to measure their effectiveness. In addition, it is imperative that systems are in place to regularly audit and monitor quality of care to maintain improvements in the nursing work environments. This is in order to ensure high quality patient care, foster staff retention, and monitor the effect of on-going changes to the nursing profession.

This study has highlighted the important role played by the ward manager in fostering a positive work environment, good team work, and achieving high standards in the care of the patients. It is therefore important that Directors of Nursing and other nurse leaders make appropriate training in nurse leadership available and accessible to the ward managers in order to strengthen leadership in the nursing profession as well as contributing to the priorities of the organisation. This research highlights differences in the interpretation or experience of clinical autonomy among English nurses as well as the importance of ward managers in supporting autonomous nursing practice. Thus education and support to develop clinical autonomy among nurses might effectively be delivered by ward managers themselves.

The EOMII originated in the identification of Magnet hospitals in the USA. Magnet accreditation currently provides the only system for benchmarking nursing internationally, without an equivalent alternative. It has taken many years to develop. The recently launched initiative by the Florence Nightingale Foundation to explore how the nursing excellence standards developed by the ANCC can be applied in England is an exciting development. This study indicates a number of key areas on which nurse leaders might want to focus in the drive to improve the nursing work

environment. Given the importance of the role of ward managers in the nursing work environment, giving ward managers support and resources to facilitate their work in supporting autonomous nursing practice is a step towards achieving excellence in nursing.

Implication for practice

As nursing has become an all-graduate profession, and the first set of the all-graduate nurses have recently qualified, ward teams will also include new roles in nursing i.e. nursing associate and apprenticeship roles; registered nurses will be expected to practise more autonomously. The implication for registered nurses is that they will be expected to be in charge of the wards and delegate tasks to care support workers, nursing associates and the nursing apprentices. Responsibilities for managing less highly qualified staff may have implications for registered nurses' conception and experience of autonomy.

Limitations

This study was conducted in two district general hospitals in the South East of England. They both had a stable workforce and it is difficult to say how typical they are of acute trusts in England, which may limit the generalizability of the study. It would be beneficial to replicate this study using a wider range of National Health Service (NHS) hospitals. Finally, the main outcome, *nurse assessed quality of care* was measured on a single item which may not be adequate to capture a range of perceptions and ratings of nursing. Although there was justification for the use of the single item given widespread use in other research using the EOMII (Kramer *et al*.

2011; Yildirim *et al.* 2012, Kramer *et al.* 2013, Bai *et al.* 2013; Bai *et al.* 2014). Furthermore, a recent study by (Stalpers *et al*. 2016) examined the concordance between objective nurse-sensitive screening indicators (screening of delirium, screening of malnutrition, and pain measures) and the single item subjective nurse-assessed care quality and found a significant positive correlation (r_s = 0.943, *p* 0.005) between the two quality measures, indicating corresponding quality ranking. However, it would be interesting to use a more complex measure, or to replace *nurse assessed quality of care* with data on patients' experiences and outcomes.

Conclusion

This study suggests that a five-factor solution to the EOMII may provide a useful scale to measure how healthy and productive nurses' work environments are in England. Although the data for this study were collected in 2012, this research makes an important and timely contribution to how the nursing work environment in England can be improved. In this England sample, the use of the EOMII highlights the importance of nurses' perceptions of their work environment in understanding the variables that hinder or assist nurses in practicing autonomously and thus providing high quality patient care. Developing new and improved measures of the nursing work environment may become increasingly important given the policy directions indicated by the HEE.

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Table 1: Description of demographic and occupational characteristics of study participants (N=247)

Characteristic	**Percentage (frequency)**
Gender (n=246)	
Male	9 (n= 22)
Female	91 (n=224)
Age (n=244)	
21 – 24	6 (n=14)
25 – 29	10 (n= 23)
30 – 34	14 (n=35)
35 – 39	24 (n=59)
40 – 44	16 (n= 38)
45 – 49	12 (n=30)
50 – 54	10 (n=24)
55 – 59	7 (n=18)
≥ 60	1 (n=3)
Education (N=247)	
Diploma	63 (n=154)
B.Sc.	37 (n=93)
Job role (N=241)	
Staff Nurse	77 (n=188)
Sister/Charge Nurse	23 (n=53)
	Mean (Standard Deviation)
Years of work experience (n=239)	11.11 (9.52)
Years of experience on present ward (n=242)	4.72 (5.14)

Table 2: Factor structure and loadings after Principle Components Analysis with varimax rotation of the EOMII

Ward Manager Support Eigenvalue = 14.486		**Working as a Team Eigenvalue = 2.853**		**Concern for patients Eigenvalue = 2.771**		**Organisational autonomy Eigenvalue = 1.886**		**Constraints on nursing practice Eigenvalue = 1.740**	
Item	Factor loading	Item	Factor loading	Item	Factor loading	Item	Factor loading	Item	Factor loading
45. Our manager is visible, available, approachable and 'safe'.	.84	52. High performance and productivity are expected of everyone.	.71	57. This is a value driven organisation.	.76	18. Nurses are held accountable in a positive way for the outcomes of autonomous clinical nursing practice.	.69	16. This organisation has many rules that prevent nurses from making independent decisions.	.80
44. The ward manager of our ward promotes staff cohesion.	.81	31. We work as a team on our ward.	.71	56. Our administration anticipates organisational changes.	.75	20. We have a committee structure through which nurses *control* nursing practice.	.63	11. Nurses here fear 'getting into trouble' if they make independent decisions.	.71
43. Our ward manager cites specific examples when providing feedback.	.80	53. We work together as a team, both within nursing and other disciplines.	.62	58. We transmit our cultural values to in-coming staff	.62	22. Doctors, administrators, and other professionals recognise that nursing *control*s its own practice.	.62	17. Nurses have to do things that, in our professional judgment, may not be in the best interests of the patient.	.63
40. Our manager is diplomatic, fair and honest	.79	34. Nurses on my ward demonstrate a proficiency level of competence. .	.59	55. Contributions of all members of the staff are valued.	.53	15. Our evidence-based practice activities provide us with the knowledge base needed to make sound clinical decisions	.57	27. Nursing practice, policies and standards are determined by nursing management, or people outside of nursing.	.48
41 Our ward manager supports and encourages interdisciplinary.	.78	32. Our group cohesiveness enables us to give quality care with our current level of staffing.	.59	48. This hospital is willing to try new things.	.48	21. Staff nurses have input and make decisions with respect to practice issues and policies.	.52	23. Shared decision-making is more talk than action here.	.40
46. Our manager instils & "lives" the organisation's	.78	51. People on my ward are enthusiastic about	.55	54. Quality patient care comes first in	.46	26. Nurses on my ward can describe decisions	.31	13. Staff nurses must obtain orders from an	.50

values regarding patient care.		their work		this organisation.		made and outcomes achieved as a result of our shared decision-making process		authority source before making independent decisions.	
47. Our manager fosters sound decision-making.	.72	49. Concern for the patient is paramount on my ward and in this hospital. .	.44	50. Problems are solved by swift action; people are not afraid to take risks.	.39				
38. Our ward manager represents the positions and interests of the staff.	.70	36. Continuing education toward a nursing degree is recognised as a way in which nurses can increase their nursing competence	.40						
39. If we need resources, our ward manager sees to it that we get these.	.66								
42. The ward manager sees to it that we have adequate numbers of competent staff.	.60								
19. Our ward manager supports our independent decision-making.	.53								
8. Our ward manager makes it possible to attend continuing education	.46								
12. Autonomous nursing practice is facilitated because nurses know that ward managers will support them.	.39								
Alpha .94 Mean (SD)= 3.13(.37)		Alpha .85 Mean (SD)= 3.15(.37)		Alpha .85 Mean (SD)= 2.91(.40)		Alpha .77 Mean (SD)= 2.91(.38)		Alpha .76 Mean (SD)= 2.60(.52)	

Table 3: Pearsons correlations between the five factors measuring the nursing work environment in England and the nurse-assessed quality of care.

	Ward manager	Teamwork	Concern for patients	Organisational autonomy	Constraints on nursing practice
Nurse-assessed care quality	.52***	.57***	.54***	.42***	-.27***
Ward manager support		.63***	.61***	.50***	-.29***
Teamwork			.69***	.54***	-.26***
Concern for patients				.59***	-.23***
Organisational autonomy					-.17**

p≤ .05 (*), p ≤ .01 (**), p ≤ .001 (***)

Table 4: Regression analysis on the effects of the five factors EOMII on Nurse-Assessed Quality of Care

	Step 1			Step 2			Step 3			Step 4		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Age	.15	.23	.05	.14	.23	.04	.12	.23	.04	.20	.18	.06
Gender	.34	.40	.06	.34	.40	.06	.36	.40	.06	.39	.31	.07
Education	.26	.24	.08	.26	.24	.07	.26	.24	.08	.10	.19	.03
R^2	-.004											
Designation				.06	.25	.02	.08	.26	.02	-.11	.20	-.03
R^2 (ΔR^2)				-.009								
Hospital							-.25	.23	-.07	-.03	.18	-.01
R^2 (ΔR^2)							-.008					
Ward manager support										.79	.28	.22**
Concern for patients										.63	.29	.18*
Working as a team										1.04	.31	.27**
Organisational Autonomy										.07	.28	.02

Constraints on nursing practice										-.38	.19	-.11*
R^2 (ΔR^2)										.382***		

* $p<.05$, ** $p<.01$, *** $p<.001$

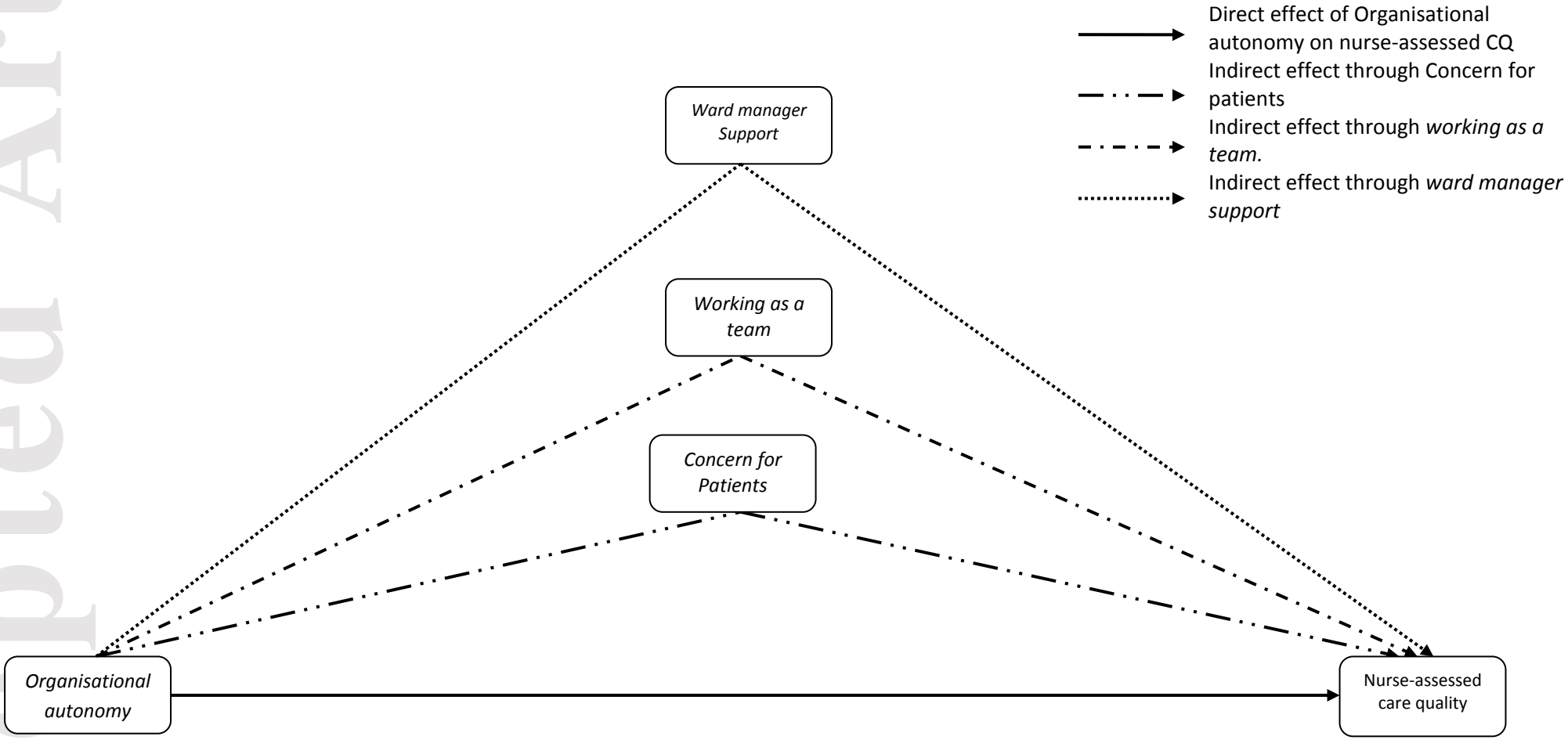

Figure 1: Diagram showing the direct and indirect effects of organisational autonomy on nurse-assessed quality of care